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**Tax Collecting Efforts and Local Allocation Tax
Grants in Japan: The Effect of Administrative
Reform Incentive Assessment on Local Tax
Collection Rates**

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Abstract

As part of the Trinity Reform, the Japanese Ministry of Internal Affairs and Communication (MIC) established the Administrative Reform Incentive Assessment (ARIA) program under the local allocation tax (LAT) system during the fiscal year of 2005. This program was aimed at motivating local governments with LAT grants to raise their tax collection rates (TCRs), since a number of economists had asserted that LAT grants eroded the fiscal discipline of local governments. Our paper uses empirical methods to estimate the average treatment effect (ATE) of the program and finds that it does not provide such an incentive and that the TCRs of local governments are unchanged by the Trinity Reform, irrespective of whether these governments receive LAT grants. We also conclude that the TCRs do not support the argument that LAT grants diminish the tax collection incentives of local governments.

JEL Classification Code: H71, H77

Key Words: Local Allocation Tax, Tax Collection Rate, Administrative Reform Incentive Assessment, Average Treatment Effect

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1. Introduction

Japan's Trinity Reform has had a great impact on local governments. Held from the fiscal years of 2004 to 2007, the Trinity Reform restructured national government disbursements, local allocation tax (LAT) grants, and the local taxation system so as to wean local governments off central government subsidies.¹ In other words, the object of the Trinity Reform was not simply to reduce the reliance of local governments on the tax revenues of the central government, but to prevent local governments from falling into poverty traps that arise from such financial dependence. In reforming LAT, the central government not only restricted the total amount of LAT grants and local deficit bonds, but also simplified the assessment formula for grant applications.² Moreover, it created the Administrative Reform Incentive Assessment (ARIA) program and raised the ratio of reservation financial resources to standard tax revenues (*ryuho zaigen hiritsu*)³ in the formula used to determine eligibility for LAT grants in order to encourage local governments to embrace administrative reform.

ARIA was aimed at motivating local governments that received LAT grants to promote administrative reform. When ARIA was established in 2005, it comprised two forms of assessment. The first rewards local governments for cuts in expenditure. Specifically, if the total amount spent by a local government on expenses such as personnel and supplies and services is less than the national average or its own average for the last several years, then its standard financial needs (SFN) are increased by the Ministry of Internal Affairs and Communication (MIC). The second form of assessment rewards local governments for improving their tax collection rates (TCRs); that is, if the

¹ Kuroda (2007) describes the details of the Trinity Reform and discusses major issues related to the local government system in Japan.

² The central government calculates the standard financial needs (SFN) and standard financial revenue (SFR) of each local government. If the SFN of a local government exceeds its SFR, the excess is allocated to that local government as an LAT grant. Concretely speaking, the SFN is the sum of the standard cost of each item of government expenditure, such as elementary schools, roads and bridges, care of the elderly, and taxation. The Ministry of Internal Affairs and Communications (MIC) assesses the standard cost of each item by multiplying the cost per unit of the item (e.g., 6,553,000 yen per teacher, 161,000 yen per kilometer of road, etc.) by the number of units and their adjustment coefficients. On the contrary, the SFR is the sum of the standard tax revenue of each item multiplied by a certain other rate for that tax item (75% for local taxes collected by local governments and 100% for local taxes collected by the central government on behalf of local governments). Examples of SFR items are individual residence tax, fixed asset tax, residence tax based on corporation tax, and light motor vehicle tax. The MIC assesses the standard tax revenue of each tax item by multiplying the standard tax base by a standard tax rate and a standard tax collection rate (TCR). The total standard tax revenue of all items minus the SFR constitutes what are called reservation financial resources. See MIC (2010) for details.

TCR of a local government exceeds the national average or its own average for the last several years, its SFN is increased by the MIC. In the 2007 fiscal year, ARIA was realigned with the Support Program for Local Governments Making Efforts, and the MIC added several other forms of assessment to ARIA. These included assessments based on the rate of migrants from other municipalities or prefectures, the value of shipments produced by the manufacturing industry, the number of business establishments, the amount of waste disposed, and the fertility rate, which have the similar objective of encouraging local governments to participate in regional reform.

As regards LAT reform, it is difficult to ignore arguments that LAT grants diminish incentives for local governments to reduce expenditure and increase tax revenue.³ Tajika and Miyazaki (2008) performed an empirical study based on this hypothesis and show that increases in the distribution of LAT grants to municipalities correlate with shrinkages in tax revenue (including revenue from individual residence tax, corporate residence tax, and fixed asset tax). Their study uses panel data analysis to eliminate individual effects and employs many explanatory variables, including population and area (Tajika and Miyazaki, 2008). It concludes that LAT grants erode the tax-collecting efforts of local governments (Tajika and Miyazaki, 2008).

Since tax revenue is the product of the tax base, tax rate, and TCR, arguments regarding tax-collecting effort may be based on four constituent factors: (i) cultivation of the tax base, (ii) arbitrariness in the assessment of the tax base, (iii) the tax rate, and (iv) the TCR.⁴ Arguments concerning the influence of these factors on the assessment formula for standard financial revenue (SFR) are open to dispute. Horiba, Mochida, and Fukae (2003) point out that SFR cannot be affected by the individual TCRs of local governments because it is calculated using a uniform and objective TCR rate (standard TCR or *hosoku chou-shuu ritsu*). Nishikawa and Yokoyama (2004) focus on the fact that while the standard TCR is uniformly applied, it is based on an average of past actual collection rates, and explore the relationship between TCRs and LAT grants from both a theoretical and an empirical angle. From the former perspective, a rise in a local government's TCR increases

³ See Tajika, Yui, and Sato (2001) and Akai, Sato, and Yamashita (2003).

⁴ This classification is based on Hayashi (2006). He bases such arguments on two factors, the tax base and the tax rate.

the SFR of all local governments because it causes an increase in the standard TCR. In other words, a local government that raises its own TCR creates negative fiscal externalities for other local governments (Nishikawa and Yokoyama, 2004). Empirically speaking, however, Nishikawa and Yokoyama (2004) found *no* significant difference between the TCRs of authorities that received LAT grants and those that did not receive them in the fiscal years of 1999 and 2000.

As stated above, ARIA was designed to strengthen the tax collection incentives of local governments by promising them an increase in their SFNs. To what degree could it improve local TCRs? Given Japanese financial conditions and the importance of policy evaluation, the effects of the program deserve scrutiny. This paper aims to refine the findings of Nishikawa and Yokoyama (2004), who used a constant dummy variable to estimate TCR disparities between local governments that received LAT grants and local governments that did not. In doing so, they implicitly assume that LAT grants affect all local governments in identical ways, despite the differences between those governments. We consider these differences and estimate the average treatment effect (ATE) of LAT grants on the TCRs of local governments, which allows LAT grants to affect different local governments in differing ways.

The paper is organized as follows. Section 2 reviews ARIA and confirms that it is an institutional incentive for local governments to improve their TCRs. Section 3 outlines our usage of the ATE as an estimation method, and Section 4 estimates the ATE of cities for ARIA. Finally, Section 5 summarizes the paper's conclusions.

2. The structure of ARIA and current local TCRs

As mentioned above, ARIA was designed to stimulate administrative reform in local government by encouraging reviews of expenditure and increases in TCRs. The former was included in an item of expenditure in SFN assessment (miscellaneous expenditures, or *sonota shohi*), while the latter is included under taxation expenses (*chouzei hi*).⁵

In the 2005 financial year, taxation expenses for municipal governments were calculated by

⁵ The former has been included under regional development expenditures (*chiiki shinkou-hi*) since the 2007 fiscal year.

multiplying the cost of a particular unit (*tan-i hiyou*) by the number of measured units (*sokutei tan-i*) by the adjustment coefficients (*hosei keisuu*). One of the six adjustment coefficients, the ordinary current condition adjustment coefficient (*keijou taiyou hosei*), increases the SFN of a government's taxation expenses in response to increases in its TCR. Specifically, the ordinary current condition adjustment coefficient was calculated as follows in the 2007 fiscal year:

$$\text{ordinary current condition adjustment coefficient} = A + (B \times (0.5 \times ((\alpha + \beta) + 1) + 0.5 \times \gamma)$$

A: The ratio of costs other than those of improving the TCR to unit cost (983/1000)

B: The ratio of the cost of improving the TCR to unit cost (17/1000)

α: The rate of improvement in the TCR compared to own past three-year average

$$\alpha = \left(\tau_{t-2}^i - \frac{\tau_{t-3}^i + \tau_{t-4}^i + \tau_{t-5}^i}{3} \right) \times \frac{1}{2}$$

τ_{t-j}^i : The TCR of local government *i* in fiscal year *t - j*

β: The rate of improvement in the TCR compared to the national average

$$\beta = \left(\tau_{t-2}^i - \frac{1}{N} \sum_{j=1}^N \tau_{t-2}^j \right) \times \frac{1}{2}$$

γ: The parameter determined according to the total number of households in local government *i*

The formula for the ordinary current condition adjustment coefficient, presented above, shows that *A*, *B*, and *γ* are exogenous variables for local governments, and *α* and *β* are endogenous; hence, local governments were able to influence their adjustment coefficients and SFNs in two years' time by controlling their TCRs.⁶ It should be noted that *only* local governments that received LAT grants had an incentive to improve their TCRs.

INCLUDE TABLE 1 HERE.

⁶ The TCR used in calculating the ordinary current condition adjustment coefficient is defined as the total TCR and includes the following tax items: ordinary taxes defined in the Local Tax Law (except for mining area tax and grants in substitution for tax on national properties) and special purpose taxes defined in the Local Tax Law.

Table 1 shows the TCRs of municipal governments for five different types of tax in the fiscal year of 2008. The overall collection rate for taxes imposed in that financial year (current TCR) was 98.1% and current TCR for each tax item exceeded 95%. At the end of the financial year, unpaid taxes totaled 422 billion yen, of which fixed asset tax and income-based individual residence tax made up around 90% (168.1 billion yen and 201.7 billion yen, respectively; see Figure 1). Therefore, estimations in Section 4 will focus on fixed asset tax and individual residence tax (the latter includes not only income-based but also lump-sum individual residence tax). The collection rate for delinquent taxes (carry-over TCR) in the fiscal year of 2008 was lower than current TCR. Overall carry-over TCR stood at 19.5% and carry-over TCR for each tax item approximated 20%.

INCLUDE FIGURE 1 HERE.

3. The ATE⁷

This section briefly describes the method of estimation used in this paper, namely, the ATE. The ATE enables us to estimate the overall effect of LAT grants on TCRs even if the individual effects of LAT grants vary across local governments. Let y_1 denote the outcome (income level, poverty ratio, land price, etc.) of the variable of interest *with* treatment (e.g., job training, education, social aid, (de)regulation of zoning practices, and other programs) and y_0 denote the outcome *without* treatment. The individual treatment effect can be expressed as the gap between outcomes with and without treatment ($y_1 - y_0$). Since it varies across individuals, the ATE is used to estimate the expected individual treatment effect as a form of program evaluation. Therefore, the ATE is defined as the expected individual effect of treatment for a randomly drawn individual from the population. With E denoting the expectation operator, the ATE is estimated using the following formula:

$$ATE \equiv E(y_1 - y_0)$$

It must be noted that y_1 and y_0 are not simultaneously observable; therefore, we cannot identify

⁷ This section largely draws from Wooldridge (2002) and Hayashi and Ishida (2008).

either $y_1 - y_0$ or the ATE without making any assumptions. This is called the program evaluation problem. We may avoid this problem by defining the ATE as the difference between the averages of the *observed data* obtained from the treatment group and the control group, but this difference is not generally consistent with the ATE. To understand this, suppose that d is a binary treatment variable that has a value of one when treatment is received and a value of zero when it is not. The observed difference between the averages of the treatment sample and the control sample could then be expressed by $E(y_1|d = 1) - E(y_0|d = 0)$. Generally speaking, however, $E(y_1|d = 1) \neq E(y_1)$ and $E(y_0|d = 0) \neq E(y_0)$ (see Figure 2); therefore, $E(y_1|d = 1) - E(y_0|d = 0) \neq ATE$. If the individuals that are randomly drawn from the population are treated— d is independent of (y_1, y_0) —then the difference between the average outcomes of the treatment group and the control group equates with the ATE, but if the randomly drawn individuals are not treated, the aforementioned difference does not equal the ATE. Since not many programs are randomly implemented, the assumption that all randomly drawn individuals will be treated imposes strong restrictions on the practicability of $ATE \equiv E(y_1|d = 1) - E(y_0|d = 0)$.

INCLUDE FIGURE 2 HERE.

Nevertheless, if an assumption called *the ignorability of treatment* holds, the ATE can be estimated even when d correlates with (y_1, y_0) .⁸ Ignorability of treatment means that d is independent of (y_1, y_0) and conditional on covariates \mathbf{x} (e.g., gender, ethnicity, educational qualifications, income level). As long as \mathbf{x} that correctly predict both the outcomes and d are employed, the gap between the outcomes minus the impact of \mathbf{x} is considered a valid estimator of the ATE, whether $d = 1$ or $d = 0$. In addition, the ATE can often be estimated using the following looser assumption:

⁸ For example, job training programs are not usually provided for everyone, but for the unskilled or the jobless, and social aid programs are provided for those whose income falls under a certain level. Obviously, therefore, d correlates with (y_1, y_0) in the case of such programs.

$$E(y_0|\mathbf{x}, d) = E(y_0|\mathbf{x}) \text{ and } E(y_1|\mathbf{x}, d) = E(y_1|\mathbf{x}) \quad (1)$$

The relationship between d and (y_1, y_0) is defined by *conditional mean independence* because (y_1, y_0) is mean independent of d . Given conditional mean independence, the ATE can be obtained as follows. If $\mu_1 \equiv E(y_1)$, $\mu_0 \equiv E(y_0)$, $v_1 \equiv y_1 - E(y_1)$, and $v_0 \equiv y_0 - E(y_0)$, y_1 and y_0 can be expressed by $y_1 = \mu_1 + v_1$ and $y_0 = \mu_0 + v_0$, respectively, and the ATE = $\mu_1 - \mu_0$. Note that $E(v_1)$ and $E(v_0)$ both equal zero, as shown by the definitions of v_1 and v_0 . The observed outcome, y , can be also expressed as below:

$$y = (1 - d)y_1 + dy_0$$

Substituting y_1 and y_0 into y , we have the following equation:

$$y = \mu_0 + d(\mu_1 - \mu_0) + v_0 + d(v_1 - v_0) \quad (2)$$

From (1) and (2), the expectation of y , conditional on \mathbf{x} and d , is as follows:

$$E(y|\mathbf{x}, d) = \mu_0 + d\delta + E(v_0|\mathbf{x}) + d[E(v_1|\mathbf{x}) - E(v_0|\mathbf{x})] \quad (\because \delta \equiv \mu_1 - \mu_0) \quad (3)$$

Based on the model of Wooldridge (2002), we specify the conditional mean values of v_1 and v_0 as the following linear function:

$$E(v_1|\mathbf{x}, d) = \eta_1 + \mathbf{x}\boldsymbol{\theta}_1, \quad E(v_0|\mathbf{x}, d) = \eta_0 + \mathbf{x}\boldsymbol{\theta}_0$$

Substituting the above into (3), we have (4):⁹

$$\begin{aligned} E(y|\mathbf{x}, d) &= (\mu_0 + \eta_0) + d\delta + \mathbf{x}\boldsymbol{\theta}_0 + d[\eta_1 + \mathbf{x}\boldsymbol{\theta}_1 - \eta_0 - \mathbf{x}\boldsymbol{\theta}_0] \\ &= (\mu_0 + \eta_0) + d\delta + \mathbf{x}\boldsymbol{\theta}_0 + d[\mathbf{x} - E(\mathbf{x})](\boldsymbol{\theta}_1 - \boldsymbol{\theta}_0) \\ &= \alpha + d\delta + \mathbf{x}\boldsymbol{\beta} + d\Delta\mathbf{x}\bar{\boldsymbol{\beta}}. \end{aligned} \quad (4)$$

$$(\because \alpha \equiv \mu_0 + \eta_0, \boldsymbol{\beta} \equiv \boldsymbol{\theta}_0, \bar{\boldsymbol{\beta}} \equiv \boldsymbol{\theta}_1, \quad \Delta\mathbf{x} \equiv \mathbf{x} - E(\mathbf{x}))$$

We regressed the outcome of (4) using the constant term, treatment dummy variable d , covariate

⁹ We derived (4) using the following relationship:

$$E(v_j) = E[E(v_j|\mathbf{x})] = \eta_j + E(\mathbf{x})\boldsymbol{\theta}_j = 0 \quad \therefore \eta_j = -E(\mathbf{x})\boldsymbol{\theta}_j \quad (i = 0, 1)$$

\mathbf{x} , and $\mathbf{x} - E(\mathbf{x})$, and found that the ATE was represented by the ordinary least squares (OLS) estimator δ .¹⁰ The fourth term in (4) implies that the effect of ARIA depends on \mathbf{x} . If \mathbf{x} does not affect the magnitude of the effect, the term is dropped and (4) can be expressed using a more popular regression model that does not include coefficient dummy variables (i.e., $E(y|\mathbf{x}, d) = \alpha + d\delta + \mathbf{x}\boldsymbol{\beta}$). However, such a regression model is too restrictive since it implicitly assumes that the individual treatment effect does not vary across individuals; therefore, we estimate the ATE of ARIA on the TCRs of local governments using (4).

4. Empirical analysis

4.1. Data

This section estimates the ATE of ARIA in the fiscal years of 1996 to 2006. It uses the data of 776 Japanese cities in order to compare the TCRs of local governments that receive LAT grants with those of local governments that do not.¹¹ Table 2 shows the definitions and descriptive statistics of variables used in our estimations.

INCLUDE TABLE 2 HERE.

We performed a logit (log-odds) transformation on the explained variables, which consist of four types of TCRs: (1) the current TCR for fixed asset tax; (2) the total TCR for fixed asset tax; (3) the current TCR for individual residence tax; and (4) the total TCR for income-based residence tax. Logit transformation is used because the explained variables are strictly between zero and one; therefore, if they are not modified or transformed, a contradiction occurs when the model is fitted: the fitted values of the variables will appear within $(-\infty, +\infty)$ because that is the theoretical range of the error term.¹² The logit transformation expands the range of the explained variables to $(-\infty, +\infty)$, thereby resolving this contradiction. Another reason why logit transformations should be

¹⁰ We substitute the sample mean of \mathbf{x} for $E(\mathbf{x})$.

¹¹ The city of Katsuyama is excluded because of a statistical outlier.

¹² The logit transformation cannot be used when an explained variable is zero or 1, but this does not occur in the data set.

performed on the explained variables is that there may be a nonlinear relationship between explained variables and explanatory variables. Consequently, it is necessary to linearize that relationship.

The explanatory variables x_i ($i = 1, \dots, 4$) must be included in the regression models used to analyze the variables, but z_j ($j = 1, \dots, 7$) are selectively included. Let us state our conclusion in advance: x_i are statistically significant in most regression models, but z_j are not always statistically significant, depending on the models used. To avoid the problem of arbitrariness in choosing regression models, we created 128 (2^7) models using all the possible combinations of z_j , and selected the best model among them (i.e., the one with the lowest AIC (Akaike Information Criterion)).

The explanatory variables are defined in Table 3, but several additional factors are deserving of further consideration. First, d is the dummy variable that differentiates between local governments that receive LAT grants and those that do not. It is natural to assign the value of one to the former and that of zero to the latter, but since over 90% of local governments receive LAT grants, this may result in multicollinearity between \mathbf{x} and $d\Delta\mathbf{x}$. Therefore, we assign the value of zero to governments that receive LAT grants and that of one to those that do not. (It should be noted that the ATE indicates the TCR levels of local governments with LAT grants in relation to those of local governments without the grants.)

Second, x_1 represents the ratio of the amount of tax accrued in the current financial year to the total amount of tax determined for collection, while x_2 represents the square of this value. These variables reflect the fact that local governments with lower TCRs have difficulty in improving their TCRs. For example, a local government with few tax delinquencies will be more easily able to achieve a TCR of 90% than one with many tax delinquencies will. The coefficients of x_1 or x_2 are indefinite because the estimation equations use both the first- and second-order terms, but at least one of the two coefficients would take positive values. One should remember that the regression models employ x_1^a when the explained variable is y^a and x_1^r when the explained variable is y^r .

Third, local government debt per capita, x_3 , denotes the degree of difficulty in the fiscal situation of the local government. The coefficient of x_3 is expected to be positive if a local government

attempts to improve its TCR due to fiscal stringency.

Fourth, x_4 signifies the ratio of SFR to SFN and z_1 signifies the square of this value. These variables determine whether LAT grants are received (i.e., whether d equals zero or one) and thus play the primary role in satisfying the assumption of conditional mean independence (see (1)).

Fifth, z_2 , z_5 , and z_6 represent the demographical and population characteristics of the jurisdiction of a local government. Nishikawa and Yokoyama (2004) show that the coefficients of all three variables have positive values, and Hayashi (2009) demonstrates that the higher the ratio of primary and secondary sector workers to total workers, the higher the TCR tends to be. The positive values of these coefficients would depend on the values of the variables.

Finally, increases in z_7 , the number of households per local tax officer, decreases TCRs because they place a higher burden on tax officers. Therefore, the coefficient of this variable is expected to have a negative value.

4.2. Results

Table 3 shows the results of estimations based on (4). First, the coefficient of the dummy variable (i.e., the ATE), the major concern of this paper, is not statistically significant for any of the explained variables, so there are no differences in the TCRs between local governments that receive LAT grants and those that do not (see the coefficient and standard error values of δ in Table 3). In addition, Wald test results show that all the models used rejected a null hypothesis ($\bar{\beta}_1 = \dots = \bar{\beta}_4 = \bar{\gamma}_1 = \dots = \bar{\gamma}_7 = 0$) for the role of x in the effect of LAT grants on TCRs (see the F values in Table 3). In other words, it is not appropriate to employ a constant dummy variable model, since the individual effect of LAT grants is not uniform across local governments.

The values of β_2 and β_3 correspond with our expectations. In particular, they prove the hypothesis that local governments with LAT grants attempt to improve their TCRs due to fiscal stringency. On the other hand, local governments without LAT grants would not seek to improve their TCRs in order to address their financial problems. This is because a null hypothesis, $H_0: \beta_3 +$

$\bar{\beta}_3 = 0$, cannot be rejected¹³. The coefficient of the ratio of SFR to SFN, β_4 , and that of its square, γ_1 , have statistically significant positive values for all the TCRs except the current TCR for individual residence tax; this means that, with the exception of the aforementioned, the TCRs rise when the ratios increase.

Other coefficients also match our expectations, except for the ratio of primary sector workers to total workers (z_5), which has a significantly negative value for all TCRs. This is incompatible with the results obtained by Nishikawa and Yokoyama (2004) and Hayashi (2009), and suggests that localities for which z_5 is high tend to have low TCRs owing to low levels of economic activity in general.

Why are the ATEs of the LAT grants for the four TCRs not statistically significant? First, ARIA was not widely recognized by local governments in the fiscal year of 2005, although we hypothesized that it would have a greater effect on TCRs in 2006. Second, the program should diminish TCR gaps between local governments, since the TCRs of local governments that received LAT grants were lower than the TCRs of those that did not before the program was introduced. For this reason, we expanded the estimation period to include the financial years of 1996 to 2006, and estimated the ATEs of LAT grants for the four TCRs for these years in a similar way. Table 4 shows only the ATEs and their standard errors (see column [1]). None of the coefficients are statistically significant, except that of the current TCR for fixed asset tax in the 1998 financial year and that of the TCR for income-based residence tax in the 2004 financial year. Therefore, there were no disparities between the TCRs for these two taxes before ARIA was introduced, irrespective of whether local governments were allocated the grants. Additionally, the program did not motivate local governments to raise their TCRs.

INCLUDE TABLE 3 HERE.

We now return to the estimation equation (4), which employs the ratio of SFR to SFN. As

¹³ The F values for the current TCR of fixed asset tax, total TCR of fixed asset tax, current TCR of individual residence tax, and total TCR of individual residence tax are 0.821, 0.000, 1.574, and 2.119, respectively.

mentioned above, this ratio is related to the TCRs of local governments with LAT grants, whereas such a relationship is not observed in other governments. Therefore, we may presume that local governments that depend on LAT grants tend to have lower TCRs, due to the poverty trap.¹⁴

The poverty trap warrants re-estimation of the ATE for the TCRs. According to Nakai (1988) and Kaizuka et al. (1988), the SFR and SFN are mostly determined by population and area. If they contain a hidden variable that is not explained by these variables and that indicates a shortage of tax effort, then the ATE would capture the tax effort. Table 4 shows the results of re-estimation (see column [2]).¹⁵ Compared to column (1), several coefficients for the current TCR for fixed asset tax are positive and statistically significant, although most coefficients, especially those for total TCR, are still insignificant. This shows that there are no differences in TCRs between local governments that receive LAT grants and local governments that do not, except for the current TCR for fixed asset tax.

INCLUDE TABLE 4 HERE.

5. Conclusion

This article examines whether ARIA, which was established in 2005, stimulates local governments with LAT grants to improve their TCRs, and estimates the ATE of the program with respect to the fixed asset tax and individual residence tax of Japanese cities. It concurrently reviews the dispute over whether LAT grants diminished the tax collection incentives of local governments before the introduction of ARIA.

The results suggest that in 2005, the TCRs of local governments with the grants did not differ from those of local governments without the grants. This trend also applies to the financial years of 1996 to 2006 and does not support the argument that the receipt of LAT grants discourages tax collection. This concurs with the empirical evidence provided by Nishikawa and Yokoyama (2004),

¹⁴ See Tajika Miyazaki (2008).

¹⁵ Because area is included in the previous estimation equation, we use x_4 to represent the logarithm of the population instead of the SFR/SFN ratio. Consequently, z_1 represents the square of the population.

although the two sets of methods were obtained using different methods and for different periods. Further, our results show that grant allocation did not affect the TCRs of local governments, since the ATEs for the financial years of 2005 and 2006 are insignificant. This suggests that ARIA was ineffective in improving local TCRs.

Tajika and Miyazaki (2008) claim that local governments that receive LAT grants are inclined to reduce their tax revenues. Since tax revenues are the product of the tax base, tax rate, and TCR, this tendency must manifest in either the tax base or the tax rate. However, few local governments impose lump-sum individual residence tax at a higher rate than the standard tax rate and the amount is negligible. Therefore, the individual residence tax rate does not obstruct the accumulation of tax revenue; hence, obstruction of the foregoing must derive from the cultivation of the tax base. Hayashi (2006) quotes Hoon (1996) and Fukao and Yue (1997), who show that taxation is not an important factor in choice of location for firms, and describes as suspect the idea that LAT grants affect incentives to cultivate the tax base. In addition, he states that no empirical evidence exists to support the hypothesis that LAT grants diminish the motivation to do so. Unfortunately, this paper is unable to clarify the relationship between LAT grants and the cultivation of the tax base. Finally, some local governments impose fixed asset tax at a higher rate than the standard tax rate, but it is not clear whether the purported desire to lower tax revenue is expressed in the tax rate or the cultivation of the tax base. Difference-in-differences (DID) estimation may provide further evidence regarding the effect of ARIA on TCRs because it will enable us to estimate the difference in TCRs before and after ARIA was implemented. This technique has the advantages of requiring only two years' worth of data and allowing us to control the TCRs by using only explanatory variables that vary over time. We aim to resolve the problems outlined above in future research.

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References

- Akai, N., M. Sato, and K. Yamashita (2003) *The Economics of Local Allocation Tax Grants*, Yuhikaku Inc., Tokyo. (In Japanese)
- Fukao, K. and X. Yue (1997) "Location decisions of Japan's electric machinery firms," *Mita Gakkai Zasshi* (Keio University), 90(2): 11-39. (In Japanese)
- Hayashi, M. (2006) "Economic Studies of Local Allocation Tax in Japan: A Critical Survey," *Journal of Economic Policy Studies*, 3(2): 6-24. (In Japanese)
- Hayashi, M. and M. Ishida (2008) "Unsubsidized Public Work Projects and Covering the Redemption of Local Bonds in the Local Allocation Tax System: Estimation by Average Treatment Effect," in Japan Institute of Public Finance (ed.) *Fiscal Restructuring and Tax Reform* (Zaisei Kenkyu), Yuhikaku Inc., Tokyo, pp.252-267. (In Japanese)
- Hayashi, T. (2009) "Review of the Collection Rate Index in Taxation and Empirical Analyses from the Root Causes of Collection Rate Differences among Local Governments," *Keizaigaku Ronkyu* (Kwansei Gakuin University), 62(4): 97-124. (In Japanese)
- Hoon, C. (1996) "The Effects of Host Countries' Tax Systems on Japanese and American Direct Investment Abroad: An Empirical Analysis of Investment by Manufacturing Industries in OECD Countries," *Hitotsubashi Ronsou* (Hitotsubashi University), 116(6): 1158-1177. (In Japanese)
- Horiba, I., N. Mochida, and K. Fukae (2003) "Local Allocation Tax and its Moral Hazard Effect on Property Tax," *Aoyama Keizai Ronsyu* (Aoyama Gakuin University), 54(4): 27-58. (In Japanese)
- Geospatial Information Authority of Japan, Ministry of Land, Infrastructure, Transport, and Tourism (2006) *A Land Survey of Prefectures and Municipalities*.
- Kaizuka, K., M. Homma, K. Takabayashi, J. Nagamine, and K. Fukuma (1986) "The Function and Evaluation of Local Allocation Tax: Part I," *Financial Review*, 2: 6-28. (In Japanese)
- Kuroda, B. (2007) *The Trinity Reform and Its Future Vision: Local Tax and Local Allocation Tax*, Gyosei Inc., Tokyo. (In Japanese)

Local Administration Bureau, Ministry of Internal Affairs and Communication (2006a) Actual Conditions of Local Public Employees 2005.

Local Administration Bureau, Ministry of Internal Affairs and Communication (2006b) A Population Summary from the Basic Resident Register 2005.

Local Public Finance Bureau, Ministry of Internal Affairs and Communication (2007a) A Local Government Finance Survey (2005 Settlement).

Local Public Finance Bureau, Ministry of Internal Affairs and Communication (2007b) A Survey of Municipal Account (2005 Settlement).

Local Tax Bureau, Ministry of Internal Affairs and Communication (2006) A Survey of Municipal Tax 2005.

Local Tax Bureau, Ministry of Internal Affairs and Communication (2010) Carried Forward Taxes and Tax Collection Rates of Local Taxes (2008 Settlement).

Ministry of Internal Affairs and Communications (2010) White Paper on Local Public Finance, 2010 – Illustrated –.

Nakai, H. (1988) A Quantitative Analysis of the Modern Fiscal Burden, Yuhikaku Inc., Tokyo. (In Japanese)

Nishikawa, M. and A. Yokoyama (2004) “The Incentives of Local Governments for Tax Collection,” Japan Center for Economic Research Economic Journal, 55: 165-179. (In Japanese)

Statistics Bureau, Ministry of Internal Affairs and Communication (2007) The Population Census.

Tajika, E., E. Yui and M. Sato (2001) “What Are the Problems of Local Allocation Tax? Loosening Fiscal Discipline and Harming Fiscal Effort,” *Zeikei Tsushin*, 56(12): 22-23. (In Japanese)

Tajika, E. and T. Miyazaki (2008), “Local Allocation Tax and the Efforts of Local Government to Improve Financial Conditions,” *Kaikei Kensa Kenkyu*, 38: 25-37. (In Japanese)

Wooldridge, J.M. (2002) *Econometrics Analysis of Cross Section and Panel Data 2nd edition*, The MIT Press, London.

Table 1. Municipal TCRs for 2008 (in billions of yen)

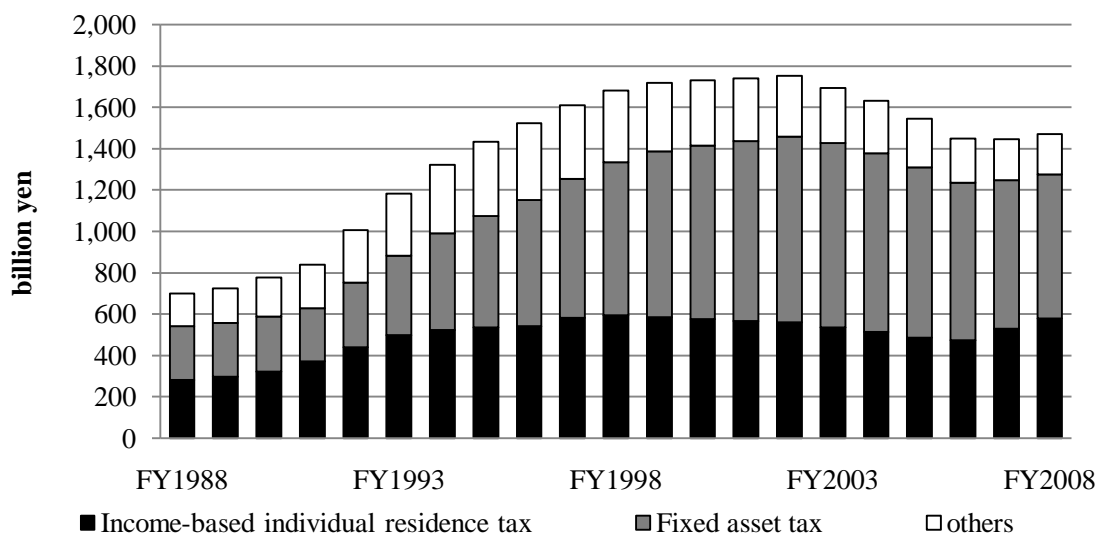
		Income-based individual residence tax	Residence tax based on corporation tax	Fixed asset tax
The amount of tax accrued in the 2008 financial year	Determined	7,363.7	2,345.6	8,925.2
	Collected	7,162.0	2,333.8	8,757.1
	TCR	97.3%	99.5%	98.1%
The amount of tax carried forward from the previous financial year	Determined	480.8	30.5	648.3
	Collected	103.6	4.9	119.1
	TCR	21.5%	15.9%	18.4%
Total	Determined	7,844.5	2,376.2	9,573.5
	Collected	7,265.6	2,338.6	8,876.3
	TCR	92.6%	98.4%	92.7%

		Light motor vehicle tax	City planning tax	Municipal tax total
The amount of tax accrued in the 2008 financial year	Determined	171.1	1,230.5	21,798.3
	Collected	165.2	1,208.3	21,376.3
	TCR	96.6%	98.2%	98.1%
The amount of tax carried forward from the previous financial year	Determined	17.9	82.2	1,304.1
	Collected	3.5	16.7	254.2
	TCR	19.8%	20.3%	19.5%
Total	Determined	189.0	1,312.8	23,102.5
	Collected	168.7	1,215.0	21,630.5
	TCR	89.3%	93.3%	93.6%

Note: Determined and collected taxes include taxes that are calculated at a higher rate than the standard tax rate and extralegal ordinary taxes are. They also include revenues from taxes that are ordinarily classified as municipal taxes, but imposed and collected by the Tokyo Metropolitan Government. However, they exclude local consumption tax.

Source: Local Tax Bureau, Ministry of Internal Affairs and Communication (2010)

Figure 1. Changes in the total amount of municipal tax arrears



Notes

(1): The graph includes taxes that are ordinarily classified as municipal taxes but imposed and collected by the Tokyo Metropolitan Government.

(2): FY stands for financial year.

Source: Ministry of Internal Affairs and Communication (2010)

Figure 2. Concept of ATE

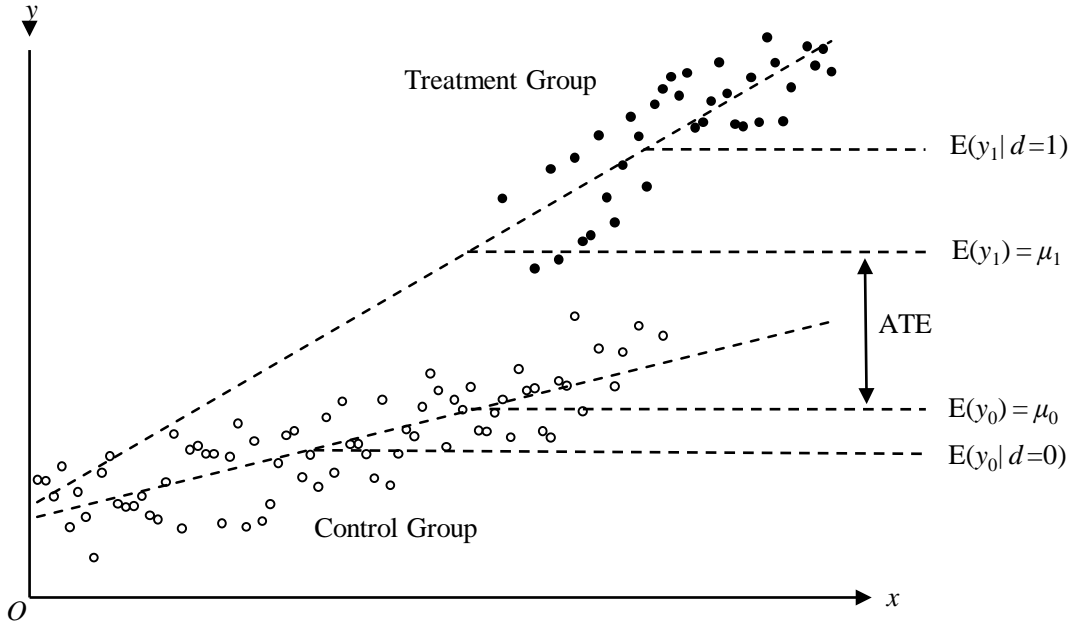


Table 2: The definitions and basic statistics of variables (2005)

Definition	Source ¹	Average	S.D.
Explained variables (TCR, before logit transformation)			
y^{ap} : Current TCR (fixed asset tax)	(a)	0.972	0.015
y^{at} : Total TCR (fixed asset tax)	(a)	0.886	0.056
y^{rp} : Current TCR (individual residence tax) ²⁾	(a)	0.976	0.007
y^{rt} : Total TCR (individual residence tax) ²⁾	(a)	0.913	0.031
Explanatory variables			
d : Dummy variable (0 when a government receives LAT grants; 1 when it does not)	(a) and (b)	0.107	0.309
x_1^a : The ratio of the amount of tax accrued in the current financial year (FY) to the total amount of tax determined for collection (fixed asset tax)	(a) and (b)	0.894	0.051
x_1^r : The ratio of the amount of tax accrued in the current FY to the total amount of tax determined for collection (individual residence tax) ²⁾	(a) and (b)	0.917	0.030
x_2^a : Square of x_1^a	(a) and (b)	0.801	0.088
x_2^r : Square of x_1^r	(a) and (b)	0.842	0.055
x_3 : Local government debt per capita (logarithm, previous year)	(b) and (c)	6.047	0.438
x_4 : The ratio of SFR to SFN	(b)	0.662	0.264
z_1 : Square of x_4	(b)	0.508	0.408
z_2 : Area (logarithm)	(d)	5.015	1.177
z_3 : Individual residence tax base per capita (logarithm, previous year) ²⁾	(c) and (e)	6.603	0.301
z_4 : Fixed asset tax base per capita (logarithm, previous year)	(c) and (e)	6.027	0.287
z_5 : The ratio of primary sector workers to total workers	(f)	0.078	0.068
z_6 : The ratio of secondary sector workers to total workers	(f)	0.319	0.077
z_7 : The number of households per local tax officer	(c) and (g)	6.679	0.303

Notes

(1) Statistics are obtained from the following sources: (a) Local Public Finance Bureau, Ministry of Internal Affairs and Communication (2007a); (b) Local Public Finance Bureau, Ministry of Internal Affairs and Communication (2007b); (c) Local Administration Bureau, Ministry of Internal Affairs and Communication (2006b); (d) Geospatial Information Authority of Japan, Ministry of Land, Infrastructure, Transport, and Tourism (2006); (e) Local Tax Bureau, Ministry of Internal Affairs and Communications (2006); (f) Statistics Bureau, Ministry of Internal Affairs and Communication (2007); and (g) Local Administration Bureau, Ministry of Internal Affairs and Communication (2006a).

(2) Individual residence tax includes both income-based and lump-sum individual residence tax.

Table 3: ATE (2005)

Coefficients/Variables	(1) TCR (fixed asset tax)		(2) TCR (individual residence tax)	
	Current TCR (y^{ap})	Total TCR (y^{at})	Current TCR (y^{rp})	Total TCR (y^{rt})
δ : Dummy variable (ATE)/ d	-0.250 (0.304)	0.003 (0.032)	-0.007 (0.106)	0.002 (0.024)
β_1 : The ratio of accrual in the current fiscal year to the amount determined for collection/ x_1	-30.200 (4.796)	-40.867*** (5.680)	-65.273*** (13.163)	-103.546*** (9.887)
$\bar{\beta}_1$: Difference from $E(x_1)/d\Delta x_1$	-4.804 (8.262)	-18.151** (7.526)	56.013** (21.833)	32.453** (13.525)
β_2 : Square of x_1/x_2	21.818*** (2.781)	29.367*** (3.268)	40.318*** (7.299)	63.769*** (5.419)
$\bar{\beta}_2$: Difference from $E(x_2)/d\Delta x_2$	2.813 (4.846)	11.279*** (4.364)	-31.241** (12.311)	-17.559** (7.491)
β_3 : Local government debt per capita/ x_3	0.108** (0.042)	0.037** (0.014)	0.072* (0.043)	0.033* (0.019)
$\bar{\beta}_3$: Difference from $E(x_3)/d\Delta x_3$	-0.032 (0.094)	-0.036 (0.041)	0.007 (0.076)	-0.006 (0.026)
β_4 : The ratio of SFR to SFN/ x_4	-0.765 (0.520)	0.154*** (0.037)	-0.253** (0.103)	0.076* (0.042)
$\bar{\beta}_4$: Difference from $E(x_4)/d\Delta x_4$	2.966 (2.051)	-0.133* (0.076)	0.210 (0.182)	-0.101 (0.068)
γ_1 : Square of x_4/z_1	0.761** (0.337)			
$\bar{\gamma}_1$: Difference from $E(z_1)/d\Delta z_1$	-1.548* (0.834)			
γ_2 : Area (logarithm)/ z_2	-0.044*** (0.011)	-0.011*** (0.004)		
$\bar{\gamma}_2$: Difference from $E(z_2)/d\Delta z_2$	-0.003 (0.024)	0.002 (0.011)		
γ_3 : Individual residence tax base per capita (logarithm)/ z_3			0.255*** (0.087)	
$\bar{\gamma}_3$: Difference from $E(z_3)/d\Delta z_3$			-0.085 (0.276)	
γ_4 : Fixed asset tax base per capita (logarithm)/ z_4	0.135 (0.096)			
$\bar{\gamma}_4$: Difference from $E(z_4)/d\Delta z_4$	-0.070 (0.131)			
γ_5 : The ratio of primary sector workers (%)/ z_5	-0.477* (0.258)	-0.224*** (0.081)	-0.649*** (0.230)	
$\bar{\gamma}_5$: Difference from $E(z_5)/d\Delta z_5$	1.100*** (0.349)	0.523*** (0.149)	1.274*** (0.445)	
γ_6 : The ratio of secondary sector workers (%)/ z_6	-0.341** (0.143)			0.152** (0.071)
$\bar{\gamma}_6$: Difference from $E(z_6)/d\Delta z_6$	0.095 (0.255)			-0.321*** (0.110)
γ_7 : The number of households per local tax officer/ z_7			-0.102** (0.046)	
$\bar{\gamma}_7$: Difference from $E(z_7)/d\Delta z_7$			0.213* (0.113)	
α : Constant	11.976*** (2.186)	14.894*** (2.500)	28.584*** (6.010)	43.383*** (4.487)
Sample size: 776				
Adjusted R squares	0.793	0.969	0.519	0.906
Akaike information criterion	-0.071	-1.813	0.047	-1.376
F value ($H_0: \bar{\beta}_1 = \dots = \bar{\beta}_4 = \bar{\gamma}_1 = \dots = \bar{\gamma}_7 = 0$)	1.772*	10.454***	2.762***	4.626***

Notes

(1): Heteroskedastic robust standard errors are in parentheses.

(2): The symbols *, **, and *** indicate statistical significance at levels of 10, 5, and 1%, respectively.

Table 4: ATE (1996 to 2006)

Financial Year	(1) x_4 : SFR/SFN ratio				(2) x_4 : population (logarithm)			
	(1-1) TCR for fixed asset tax		(1-2) TCR for individual residence tax		(2-1) TCR for fixed asset tax		(2-2) TCR for individual residence tax	
	Current TCR	Total TCR	Current TCR	Total TCR	Current TCR	Total TCR	Current TCR	Total TCR
1996	-0.344 (0.250)	0.001 (0.051)	0.233 (0.249)	0.037 (0.080)	0.014 (0.063)	0.007 (0.044)	-0.068 (0.050)	-0.024 (0.017)
1997	-0.277 (0.237)	0.095 (0.062)	-0.110 (0.228)	-0.059 (0.070)	0.066 (0.070)	0.048 (0.053)	0.052 (0.120)	0.021* (0.012)
1998	-1.030*** (0.326)	-0.061 (0.072)	-0.107 (0.079)	-0.016 (0.016)	0.094** (0.044)	-0.024 (0.052)	-0.010 (0.037)	-0.010 (0.010)
1999	-0.238 (0.527)	0.195 (0.366)	-0.143 (0.617)	-0.085 (0.122)	0.227 (0.153)	-0.056 (0.090)	-0.036 (0.185)	0.043 (0.040)
2000	0.161 (0.740)	0.566 (0.603)	-0.282 (0.584)	-0.138 (0.133)	0.234** (0.102)	-0.087 (0.068)	0.139** (0.069)	-0.011 (0.017)
2001	0.386 (0.523)	0.479 (0.406)	-0.309 (0.340)	0.008 (0.021)	0.225*** (0.072)	0.028 (0.033)	0.017 (0.043)	-0.001 (0.010)
2002	-0.209 (0.252)	0.014 (0.138)	-0.042 (0.065)	0.012 (0.016)	0.177** (0.088)	0.020 (0.034)	-0.006 (0.086)	-0.011 (0.011)
2003	-0.047 (0.187)	0.109 (0.106)	-0.046 (0.087)	0.023 (0.021)	0.049 (0.083)	-0.036 (0.039)	-0.031 (0.061)	0.011 (0.026)
2004	0.060 (0.193)	0.043 (0.035)	-0.380* (0.212)	-0.005 (0.024)	0.122 (0.087)	0.018 (0.029)	-0.081 (0.080)	-0.056 (0.036)
2005	-0.250 (0.304)	0.003 (0.032)	-0.007 (0.106)	0.002 (0.024)	0.081 (0.079)	-0.024 (0.042)	-0.042 (0.085)	-0.007 (0.012)
2006	-0.218 (0.212)	-0.008 (0.031)	-0.082 (0.060)	-0.010 (0.015)	0.067 (0.068)	-0.037 (0.038)	-0.054 (0.059)	-0.007 (0.012)

Notes

(1): Heteroskedastic robust standard errors are in parentheses.

(2): The symbols *, **, and *** indicate statistical significance at levels of 10, 5, and 1%, respectively.

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